**CULMINATING ACTIVITY:**

**GRADE 7**

**UNDERSTANDING LIFE SYSTEMS: INTERACTIONS IN THE ENVIRONMENT**

**CREATED BY: LORELEI ADARNA AND JEANETTE JACOBS**

**APRIL 2011**

**CULMINATING TASK**

*THIS SECTION WILL INCLUDE:*

* **ACTUAL HAND FOR STUDENTS**
* **ASSESSMENT TOOLS TO BE USED ALONG THE WAY FOR CHECK POINTS OF PROGRESS**
* **RUBRICS THEY WILL USE TO EVALUATE THEMSELVES AND EACHOTHER**
* **RUBRIC TEACHER WILL USE TO GIVE FEEDBACK**
* **RUBRIC TEACHER WILL USE TO MARK THE FINAL PRODUCT (ONE FOR RESEARCH PART AND ONE FOR HANDS ON PART)**
* **LEARNING SKILLS SELF AND PEER EVALUATION**

C:\Users\Jean\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\2MW9V1YW\MC900052900[1].wmfSave Our Ecosystems!

You and your partner are environmentalists interested in saving animals that are becoming extinct throughout Canada. Through research, you realize that the type of ecosystem your animal lives in is being negatively affected by human impact. Your job is to research the type of ecosystem being affected, and the specific aspects of it that are being harmed. You need to present your case to the Environmentalists of Canada in order to save your endangered species and their ecosystem.

Task 1: Research

Step One: with a partner, use different sources e.g. books, textbooks, and websites, to research one specific endangered species and then find out what ecosystem they live in and what aspects of it are being negatively harmed. Your proposal for the ecosystem will be due on **April 6th, 2011**. (this can be done in pairs)

Step two: Each student must have a rough copy of their research, and be ready for self and peer feedback. Students will meet with the teacher for a teacher-student conference. This is due: **April 11th, 2011**. (this must be done individually)

Step three: Each student will submit a 3-page research paper that is due on **April 13th, 2011**. (this must be done individually)

*Success Criteria*

* explains in depth the type of ecosystem that the endangered species lives in, including abiotic (non-living) and biotic (living) elements
* talk about the cycling of events between producers, consumers and decomposers, and the interactions between them
* explain what secondary succession is, and how this is effecting the environment
* explain how human activity is affecting your ecosystem
* must use science terminology
* **argue why protecting Canada`s ecosystems is important**
* **propose a way to reduce the harmful human impact on your ecosystem**

Task 2: Create the Ecosystem

Your job is to replicate your endangered species’ ecosystem to present to a panel of the Environmentalists of Canada. This will be done in pairs. The purpose is to show them how your ecosystem is being negatively affected by humans. Our school will supply you with the basic needs of an ecosystem e.g. soil, shoebox/pizza box/container (to build your ecosystem in), water, Model Magic, and markers. Use your creativity to create an ecosystem that would require any other materials, however, these materials would have to be supplied by you. You will have work periods for building your ecosystem with your partner from **April 14th, 15th, and 18th** in class, due at the end of class on **April 18th, 2011**.

Step 1: Each pair will submit a list of materials needed to start building your ecosystem. Provide a sketch of what your ecosystem will look like, including what materials you’ll be making each part with, and what materials you would like the teacher to provide. This is due on **April 14th, 2011**.

Step 2: Bring in materials to work on your ecosystem model in class from **April 14th, 15th, and 18th, 2011**.

*Success Criteria*

* must be clearly labelled e.g. consumers, producers, abiotic and biotic parts
* must be an authentic representation of actual ecosystem
* organized
* includes all components of an ecosystem
* uses class time wisely/comes prepared to class

Extension

You and your partner will bring your completed model and will display it to the rest of the class during a Gallery Walk. Students will present their proposal to a panel of judges as to why their ecosystem needs to be saved on **April 19th, 2011**.

**TASKS ALONG THE WAY FOR CULMINATIING TASK (ASSESSMENT TOOLS)**

**Save our Ecosystems**

Task 1: *Step 1 (completed in pairs)*

Investigator 1:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Investigator 2:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Due: April 6. 2011**

*Questions:*

1. What endangered species have you selected to investigate and why?

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1. What type of ecosystem does your species live in? Give a few ideas of elements of that ecosystem.

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At least 2 sources that were used: (list the websites, books, or textbooks that you are getting your information from)

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

*Teacher approval and feedback notes (to be completed by teacher):*

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Save our Ecosystems**

Task 1: Guided questions along the way (*to be completed individually*)

Due Date: **to be completed before you begin writing your rough draft, to be handed in with final copy**

*Questions:*

1. What are the different elements of your ecosystems (abiotic and biotic)?

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1. Explain the types of producers that are present in your ecosystem.

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1. Explain the types of consumers that are present in your ecosystem.

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1. Explain the types of decomposers that present in your ecosystem.

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1. Explain the interaction that occurs amongst the consumers, producers and decomposers.

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1. What is secondary succession?

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1. What type of secondary succession is occurring in your chosen ecosystem?

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1. Human activities have the potential to alter the environment (i.e. secondary succession), why must we try to make sure that these changes don’t affect Canada’s ecosystems in a bad way? (Use your own thinking!)

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1. What other types of human activity might potentially affect different types of ecosystems in the near future? (i.e. technology). What can we do to stop these potential threats? (Use your own thinking)

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1. Make a connection: what types of activities are you taking part in at home or at school that may not be friendly to the environment? What can you do to change your actions to be more environment-friendly? (Use your own thinking)

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1. What actions can we take to make Canada more eco-friendly? (use your own thinking)

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**Save our Ecosystems**

Task 2: Step 1 (*to be completed in pairs*)

**Due Date: April 14**

Draw a diagram of what your ecosystem will look like:

What materials do you think you will need to use for this project:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What additional materials would you like from the teacher:

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Teacher approval and feedback notes: (*to be completed by teacher*)

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**RUBRICS**

**Save our Ecosystems- Persuasive Writing Component (50%) – Teacher for Rough Copy**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Category | Level 1 | Level 2 | Level 3 | Level 4 |
| Purpose and Audience | * Writing shows no reference to an intended audience * Writing seems to have no direct purpose | * some of the writing is directed towards to a specific audience * some of writing has an underlying intended purpose | * most of writing is cautious of the audience * most of the writing has an intended purpose | * the entire piece is written with the audience in mind and clearly identifies the purpose of this piece |
| **Developing, clarifying and establishing thinking** | * this piece of writing has no flow * the thinking are poorly developed | * some of the writing flows nicely * some of the thinking is developed and is starting to become persuasive | * majority of the writing flows nicely * majority of the thinking presented flow nicely together and are considered persuasive | * most, if not all, of the writing has a great flow and is easy to read * this piece is clearly persuasive and engages the audience * the writer is clearly using their own thinking in their writing |
| **Application** (Voice) | * writer’s voice in unknown * no knowledge of ecosystems is being used to convince the reader to feel a certain way | * writer’s voice is starting to become apparent * little knowledge of ecosystems is being used to convince the reader to feel a certain way | * writer’s voice is most of the time apparent * some knowledge of ecosystems is being used to convince the reader to feel a certain way | * the writer’s voice known throughout the entire piece * knowledge of ecosystem is being used to convince the reader to feel a certain way |
| Vocabulary, grammar, punctuation and proofreading | * no proofreading is apparent * grammar and punctuation is not edited | * little proofreading has occurred * The text has some spelling and grammatical errors. | * Proofreading is apparent * The text has a few minor spelling and grammatical errors. | * Proofreading was effectively used * The text is virtually free of spelling and grammatical errors. |

**Mark: \_\_\_\_\_\_\_\_\_**

**Comments:**

**Save our Ecosystems- Persuasive Writing Component (50%) – Self for Rough Copy**

**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Category | Level 1 | Level 2 | Level 3 | Level 4 |
| Purpose and Audience | * Writing shows no reference to an intended audience * Writing seems to have no direct purpose | * some of the writing is directed towards to a specific audience * some of writing has an underlying intended purpose | * most of writing is cautious of the audience * most of the writing has an intended purpose | * the entire piece is written with the audience in mind and clearly identifies the purpose of this piece |
| **Developing, clarifying and establishing thinking** | * this piece of writing has no flow * the thinking are poorly developed | * some of the writing flows nicely * some of the thinking is developed and is starting to become persuasive | * majority of the writing flows nicely * majority of the thinking presented flow nicely together and are considered persuasive | * most, if not all, of the writing has a great flow and is easy to read * this piece is clearly persuasive and engages the audience * the writer is clearly using their own thinking in their writing |
| **Application** (Voice) | * writer’s voice in unknown * no knowledge of ecosystems is being used to convince the reader to feel a certain way | * writer’s voice is starting to become apparent * little knowledge of ecosystems is being used to convince the reader to feel a certain way | * writer’s voice is most of the time apparent * some knowledge of ecosystems is being used to convince the reader to feel a certain way | * the writer’s voice known throughout the entire piece * knowledge of ecosystem is being used to convince the reader to feel a certain way |
| Vocabulary, grammar, punctuation and proofreading | * no proofreading is apparent * grammar and punctuation is not edited | * little proofreading has occurred * The text has some spelling and grammatical errors. | * Proofreading is apparent * The text has a few minor spelling and grammatical errors. | * Proofreading was effectively used * The text is virtually free of spelling and grammatical errors. |

**Mark: \_\_\_\_\_\_\_\_\_**

**Comments:**

**Save our Ecosystems- Persuasive Writing Component (50%) – Peer for Rough Copy**

**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Category | Level 1 | Level 2 | Level 3 | Level 4 |
| Purpose and Audience | * Writing shows no reference to an intended audience * Writing seems to have no direct purpose | * some of the writing is directed towards to a specific audience * some of writing has an underlying intended purpose | * most of writing is cautious of the audience * most of the writing has an intended purpose | * the entire piece is written with the audience in mind and clearly identifies the purpose of this piece |
| **Developing, clarifying and establishing thinking** | * this piece of writing has no flow * the thinking are poorly developed | * some of the writing flows nicely * some of the thinking is developed and is starting to become persuasive | * majority of the writing flows nicely * majority of the thinking presented flow nicely together and are considered persuasive | * most, if not all, of the writing has a great flow and is easy to read * this piece is clearly persuasive and engages the audience * the writer is clearly using their own thinking in their writing |
| **Application** (Voice) | * writer’s voice in unknown * no knowledge of ecosystems is being used to convince the reader to feel a certain way | * writer’s voice is starting to become apparent * little knowledge of ecosystems is being used to convince the reader to feel a certain way | * writer’s voice is most of the time apparent * some knowledge of ecosystems is being used to convince the reader to feel a certain way | * the writer’s voice known throughout the entire piece * knowledge of ecosystem is being used to convince the reader to feel a certain way |
| Vocabulary, grammar, punctuation and proofreading | * no proofreading is apparent * grammar and punctuation is not edited | * little proofreading has occurred * The text has some spelling and grammatical errors. | * Proofreading is apparent * The text has a few minor spelling and grammatical errors. | * Proofreading was effectively used * The text is virtually free of spelling and grammatical errors. |

**Mark: \_\_\_\_\_\_\_\_\_**

**Comments:**

**Save our Ecosystems- Content and Knowledge Component (50%)** – **Teacher for Final**

**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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| --- | --- | --- | --- | --- |
| Category | Level 1 | Level 2 | Level 3 | Level 4 |
| Knowledge and Understanding | * There is no evidence of understanding of ecosystem * Writing seems to have no direct purpose | * There is little evidence of understanding of ecosystem * Some reference to producers, consumers, decomposers and their roles * Writing seems to have little direction | * There is some evidence of understanding of ecosystem * Sufficient reference to producers, consumers, decomposers and their roles * writing mostly has a direction | * there is clear evidence of understanding of ecosystems * clear reference to producers, consumers, decomposers and their roles * writing has a very clear direction and flow |
| Science terminology | * no science terminology is used * if science terminology is used, it is not used properly | * minimal science terminology is used | * some science terminology is used and explain in the proper context | * Much science terminology is used properly, is well explained and enriches the writing |
| Communication of Ideas (clarity) | * writer’s voice in unknown and unclear * seems to be confusing most of the fundamental ideas | * writer’s voice is sometimes known * seems to be confusing some of the fundamental ideas | * writer’s voice is most of the time known * most of the ideas are being explained with clarity | * writer’s voice is always known and apparent * All of the ideas are explained with much clarity and understanding |

**Mark: \_\_\_\_\_**

**OVERALL MARK FOR WRITING PIECE:\_\_\_\_\_\_**

**Comments:**

**Save our Ecosystems- Hands on Task (Teacher Evaluation)**

**Names of Partners:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Category | Level 1 | Level 2 | Level 3 | Level 4 |
| Knowledge | * Ecosystem model does not represent the authentic system | * Parts of ecosystem model represent the authentic system | * Most of ecosystem is authentically displayed and represented | * Entire ecosystem model is displayed in an authentic manner that represents the real thing |
| Communication | * Labels are not included, and if they are, they not labelled properly | * Some labels are included * Did not always label the proper parts | * Labels are present and properly placed | * Labels are present, properly placed, and enhance the diorama for the viewer |
| Visual appeal | * Clear that group did not take much time to complete the task * Not very organized * No visual appeal | * Diorama is somewhat organized and displayed but is missing some visual appeal | * Diorama includes all necessary aspects in a presentable way * Very organized | * Diorama is extremely well represented and easy to understand * Has gone above the expectations and created and incredibly creative diorama |

**Mark:\_\_\_\_\_\_**

**Comments:**

**Self and Peer Evaluation: Learning skills and work habits**

**Responsibility**: *Fulfills responsibilities and commitments within the learning environment; takes responsibility for and manages own behaviour*

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1  Self | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1  Peer | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

**Organization**: *Devises and follows a plan and process for completing work and tasks; establishes priorities and manages time to complete tasks and achieve goals; identifies, gathers, and evaluates, and uses information, technology, and resources to complete tasks*

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1  Self | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1  Peer | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

**Independent work***: Independently monitors, assesses, and revises plans to complete tasks and meet goals; uses class time appropriately to complete tasks; follows instructions with minimal supervision*

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1  Self | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1  Peer | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

**Collaboration**: *Accepts various roles and an equitable share of work in a group; responds positively to the ideas, opinions, values, and traditions of others; builds healthy peer-to-peer relationships in person and through personal and media assisted interactions; Works with others to resolve conflicts and build consensus to achieve group goals; Share information, resources, and expertise, and promotes critical thinking to solve problems and make decisions*

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1  Self | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1  Peer | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

**Initiative**: *Looks for and acts on new ideas and opportunities for learning; Demonstrates curiosity and interest in learning; Approaches new tasks with positive attitude; Recognizes and advocates appropriately for the rights of self and others*

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1 | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader  Self | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1  Peer | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

**Self Regulation**: *Sets own individual goals and monitors progress towards achieving them; Seeks clarification or assistance when needed; Asses and reflects critically on own strengths, needs and interests; Identifies learning opportunities, choices, and strategies to meet personal needs and achievement goals; Preserves and makes an effort to challenges*

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1 | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader  Self | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

|  |  |  |  |
| --- | --- | --- | --- |
| Level 1  Peer | Level 2 | Level 3 | Level 4 |
| I did the very minimal and was not a good leader | I did not do as much as I could have | I am a good leader | Wow! I am a great leader |

Overall mark for yourself:\_\_\_\_\_\_\_

Overall mark for your partner: \_\_\_\_\_\_\_

Additional Comments about your work: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Additional comments about partners work: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**TEACHERS NOTES**

*THIS SECTION WILL INCLUDE:*

* **SCOPE AND SEQUENCE FOR THE ENTIRE UNIT**
* **EXPECTATIONS FOR EACH PART OF THE CULMINATING TASK**
* **ACCOMODATIONS, MATERIALS, PRIOR KNOWLEDGE AND SKILLS**
* **HAND OUTS THAT CAN BE GIVEN TO STUDENTS THROUGH THE UNIT**

Teacher’s Notes

The culminating activity “Save Our Ecosystems!” will occur at the end of the grade 7 science unit on ‘Understanding Life Systems: Interactions in the Environment’ and will address all of the Overall Expectations: 1) assess the impacts of human activities and technologies on the environment, and evaluate ways of controlling these impacts; 2) investigate interactions within the environment, and identify factors that affect the balance between different components of an ecosystem; and 3) demonstrate an understanding of interactions between and among biotic and abiotic elements in the environment. This unit assumes that science classes occur twice a week, and should take 4-6 weeks to complete.

**Scope and Sequence for Understanding Life Systems- Interactions in the Environment (1 month unit, science is held twice a week- sometimes 3 times)**

Feb 28- Biotic and Abiotic elements

* Activity: concept attainment
* Review definition and examples

March 2- Revisiting Biotic and Abiotic Elements

* Small groups activity: ‘Stay and Stray’🡪 each table will become an expert on one of the basic needs of biotic elements
* An ‘expert’ will be elected by the teacher who will stay behind as the other group members will travel to other groups to attain information for their graphic organizer. The expert who stays behind will be responsible for give those who visit his/her table the necessary information his/her table groups ‘basic need’. Once the group members are finished travelling around, they will come back to their original group and share their findings with the ‘expert’
* Ticket- out- the- door (**diagnostic assessment**)

March 7- Producers, Consumers, Decomposers

* Students will be placed in partners (elbow partners) and will be given a reading and an organizer- their task will be to read through the article together, highlighting important information and putting it in their graphic organizer. There will be focus on examples of each type of consumer, producer and decomposer, and once complete we will investigate the connection between all 3
* Answers will be shared towards the end of the class

March 9- Food Chain

* Gizmo application that shows how a food chain works and can be altered depending on population at each level
* [www.explorelearning.ca](http://www.explorelearning.ca)
* Will debrief on video and analyze the importance of a food chain in our environments

March 11- Energy Transfer/ Energy Pyramid/ Food webs

* Arts integration: supply students with the necessary information of how a food pyramid might work and then give them a blackliner of a 2-D pyramid. They will have to write on the blackliner the necessary information for each stage of the pyramid and will then have to turn the 2D pyramid into a 3D one (using instructions by teacher)- can be creative and add colour and pictures for each stage
* Speak about the difference between a Pyramid and a food web (show a visual representation of both side- by- side)
* **Diagnostic assessment**

March 18- Review all information from last few weeks (check point) and then quiz to check for understanding

* Create a jeopardy game that reviews all major definitions and concepts that have so far been examined
* Towards the end of class give students a short and to the point quiz to check for understanding (**formative assessment**)

March 20- Primary and Secondary succession/ Climax Community

* Minds on: [www.youtube.com/watch?v=vNHnwHaSolA&p=E407EC6F277BE28D&playnext=1&index=29](http://www.youtube.com/watch?v=vNHnwHaSolA&p=E407EC6F277BE28D&playnext=1&index=29)
* Discuss primary vs. secondary succession
* Get students to think pair share of examples for both
* Hand out work sheet (**formative assessment**) (included in teachers notes)

March 25- Human activities within an ecosystem

* Minds on: “Did you Know” YouTube video
  + Analysing the progress of technology
  + Have an inquiry based discussion of what the video means, how it relates to us, and how it can impact our ecosystems
* Silent graffiti in small groups:
  + In the center of a big chart paper write out “How do we protect our environment?” and get each student to have a marker and write down any ways that they can think ok to protect our environment from being harmed
  + Each group will share their graffiti
  + Separate ways to protect our: AIR, HABITAT, WATER
* Look at the bigger picture: why do we care about saving our environment?
* In class activity (in pairs):
  + Choose an electronic device and think about/ analyze how much of this product is used by Canadians (i.e. how important is this device to us)
  + Propose an eco-friendly way to dispose of it
  + Analyze if this proposed option can be used by Canadians across Canada (do you think Canadians would have a problem adopting your proposal? Why or why not?)
  + **Formative assessment**

March 27- Sustainable Communities

* [www.footprintnetwork.org](http://www.footprintnetwork.org) 🡪 one student will be elected to represent our class and answer the questions that relate to calculating our ecological footprint
* How does knowing our footprint make us feel about how we are impacting the Earth? Do we feel good about our actions? Do we want to change them?
* Hand out for students about sustainable ecosystem and a few other related definitions (included in teachers notes)

April 4th – Milling to Music: end of unit review of 30 words, where each student is an expert of a word. Students will test each other on their knowledge and the culminating task distributed (**diagnostic assessment**).

April 5th – Persuasive writing: students are presented with an article and exposed to how to develop their own voice in their writing as is necessary for their proposal.

April 6th, 2011 – Students will have completed the proposal and submitted it (**formative assessment**).

April 7th, 2011 – Students will engage in an Inside/Outside Circle activity in order to introduce the bigger ideas of this project e.g. environmental stewardship.

April 11th, 2011 - Rough copy of research due and self and peer feedback will be provided. Students will meet for teacher-student conference( **formative assessment**).

April 13th, 2011 – Each student will have their research paper due (**summative assessment**).

April 14th, 2011 – Each pair will submit a list of materials to start building ecosystem.

April 14th, 15th, and 18th, 2011 – Students will have work periods in class to work on their model, and it will be due at the end of class on April 18th, 2011 (**summative assessment**).

April 19th, 2011 – Students will engage in a Gallery Walk of their ecosystems and present their proposal to a panel of judges as to why their endangered species’ ecosystem should be saved.

* Students will take part in a self and peer ‘learning skills’ assessment

***EXPECTATIONS FOR THE CULMINATING TASK- SEPERATED ACCORDING TO TASK***

**Task 1: Research**

**Completion of the first step: the ecosystem research proposal will cover the following specific expectations:**

*Science*

2.4 – use appropriate science and technology vocabulary, including *sustainability*, *biotic*, *ecosystem*, *community*, *population*, and *producer*, in oral and written communication

3.1 – demonstrate an understanding of an ecosystem as a system of interactions between living organisms and their environment

3.2 – identify biotic and abiotic elements in an ecosystem, and describe the interactions between them

*Language - Reading*

1.1 - read a wide variety of increasingly complex or difficult texts from diverse cultures, including literary texts, graphic texts, and informational texts

1.9 **-** identify the point of view presented in texts, including increasingly complex or difficult texts; give evidence of any biases they may contain; and suggest other possible perspectives

*Language – Writing*

1.1 - identify the topic, purpose, and audience for more complex writing forms

1.3 - gather information to support ideas for writing, using a variety of strategies and a wide range of print and electronic resources

1.5 - identify and order main ideas and supporting details and group them into units that could be used to develop a multi-paragraph piece of writing, using a variety of strategies and organizational patterns

1.6 - determine whether the ideas and information they have gathered are relevant, appropriate, and sufficiently specific for the purpose, and do more research if necessary

**Completion of the second step: rough copy and the third step: good copy of their research paper will cover the following specific expectations:**

*Science*

2.4 – use appropriate science and technology vocabulary, including *sustainability*, *biotic*, *ecosystem*, *community*, *population*, and *producer*, in oral and written communication

2.5 – use a variety of forms to communicate with different audiences and for a variety of purposes

3.1 – demonstrate an understanding of an ecosystem as a system of interactions between living organisms and their environment

3.2 – identify biotic and abiotic elements in an ecosystem, and describe the interactions between them

3.3 – describe the roles and interactions of producers, consumers, and decomposers within an ecosystem

3.4 – describe the transfer of energy in a food chain and explain the effects of the elimination of any part of the chain

3.5 – describe how matter is cycled within the environment and explain how it promotes sustainability

3.6 – distinguish between primary succession and secondary succession within an ecosystem

3.8 – describe ways in which human activities and technologies alter balances and interactions in the environment

*Language – Writing*

1.1 - identify the topic, purpose, and audience for more complex writing forms

1.3 - gather information to support ideas for writing, using a variety of strategies and a wide range of print and electronic resources

1.5 - identify and order main ideas and supporting details and group them into units that could be used to develop a multi-paragraph piece of writing, using a variety of strategies and organizational patterns

1.6 - determine whether the ideas and information they have gathered are relevant, appropriate, and sufficiently specific for the purpose, and do more research if necessary

2.2 - establish a distinctive voice in their writing appropriate to the subject and audience

2.5 - identify their point of view and other possible points of view, evaluate other points of view, and find ways to acknowledge other points of view, if appropriate

2.6 **-** identify elements in their writing that need improvement, selectively using feedback from the teacher and peers, with a focus on voice, diction, and an effective beginning and ending

2.7 **-** make revisions to improve the content, clarity, and interest of their written work, using a variety of strategies

2.8 **-** produce revised draft pieces of writing to meet identified criteria based on the expectations

3.6 **-** proofread and correct their writing using guidelines developed with peers and the teacher

3.8 **-** produce pieces of published work to meet identified criteria based on the expectations

**Task #2: Creating an Ecosystem**

The second task will cover the following expectations:

*Science*

2.1 – follow established safety procedures for investigating ecosystems

2.2 – design and construct a model ecosystem, and use it to investigate interactions between the biotic and abiotic components in an ecosystem

2.3 - use scientific inquiry/research skills to investigate occurrences that affect the balances within a local ecosystem

2.4 – use appropriate science and technology vocabulary, including *sustainability*, *biotic*, *ecosystem*, *community*, *population*, and *producer*, in oral and written communication

2.5 – use a variety of forms to communicate with different audiences and for a variety of purposes

3.2 – identify biotic and abiotic elements in an ecosystem, and describe the interactions between them.

**Extension**

This task will cover the following expectations:

*Science*

2.4 – use appropriate science and technology vocabulary, including *sustainability*, *biotic*, *ecosystem*, *community*, *population*, and *producer*, in oral and written communication

2.5 – use a variety of forms to communicate with different audiences and for a variety of purposes

3.1 – demonstrate an understanding of an ecosystem as a system of interactions between living organisms and their environment

3.2 – identify biotic and abiotic elements in an ecosystem, and describe the interactions between them

3.5 – describe how matter is cycled within the environment and explain how it promotes sustainability

3.7 – explain why an ecosystem is limited in the number of living things that it can support

3.8 – describe ways in which human activities and technologies alter balances and interactions in the environment

*Language – Oral Communication*

1.8 **-** explain the connection between a speaker’s tone and the point of view or perspective presented in oral texts

1.9 **-** identify a wide variety of presentation strategies used in oral texts and evaluate their effectiveness

2.1 **-** identify a range of purposes for speaking and explain how the purpose and intended audience might influence the choice of speaking strategies

2.2 **-** demonstrate an understanding of appropriate speaking behaviour in most situations, adapting contributions and responses to suit the purpose and audience

2.3 **-** communicate orally in a clear, coherent manner, using a structure and style appropriate to both the topic and the intended audience

2.4- use appropriate words, phrases, and terminology from the full range of their vocabulary, including inclusive and non-discriminatory language, and a range of stylistic devices, to communicate their meaning accurately and engage the interest of their intended audience

**Accommodations, Materials Prior Knowledge and Hand outs:**

Accommodations

Students will be placed in teacher-selected heterogeneous pairings to work on this assignment. The assignment will be broken down into smaller tasks, to act as checkpoints for each student. For ELLs, students will be provided with research for 5 different animals. Students will be responsible for selecting their own animal and will have an opportunity to work on it. For those with special needs, IEPs, or growth plans, they will receive extra teacher support, and EA support when available. They will be taken out during the science periods to periodically check on their progress. If challenges are being seen on the part of the student, necessary accommodations will be made (for example: more chunking, more extensively detailed reports, use of technology to present and record their findings- on individual needs basis).

Materials and Resources

Teacher will provide some building/consumable materials and background information for the students dioramas e.g. Model Magic, container, water, and soil. Students will also have an opportunity to request materials from the teacher, but will be responsible for obtaining all other materials from home.

Prior knowledge and skills required:

These are outlined in the scope and sequence of the unit:

* Students must have a strong grasp of the unit concepts that are being presented in class in order to successfully complete the culminating tasks
* Main concepts (as outlined in the scope and sequence): understanding of biotic and abiotic elements; the roles of producers, consumers and decomposers; the affect of human interaction on our environment; what we can do to help the world become more aware and more cognisant of their actions- leading to the world becoming a more eco-friendly place; why it matters to be more aware of actions (looking at the bigger picture of this unit and applying it to the whole world, while looking into the future)

Handouts

Along the way (during the unit): students will be presented with a few different hand outs (*attached to ‘Teachers Notes’*)

Culminating Task: Students will be provided with a graphic organizer for producing the rough copy of their research proposal, guided questions to aid them during their research, peer and self assessments forms, and one worksheet for submitting their ecosystem design.(*attached in the Culminating Task section*)

**Sources:**

The Ontario Curriculum Grades 1-8: Science and Technology (2007)

Pearson, Investigating Science and Technology 7 (2008)

Ministry of Education Report Cards, Grades 7-8 (2010)

**HAND OUTS FOR UNIT:**

C:\Users\Jean\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\8758GIY1\MC900014747[1].wmfSuccession and Ecosystems Name:

1. Ecological \_\_\_\_\_\_\_\_\_\_\_\_ is the predictable and orderly change over time in the types of organisms in an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Changed environments create \_\_\_\_\_\_\_\_ conditions for new species.
3. \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ occurs in areas where there has never been life.
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are one type of organism that can colonize a bare rock and begin the process of building soil.
5. Once lichens are established, \_\_\_\_\_\_\_\_\_\_\_ can now come and live in the area.
6. Succession is a \_\_\_\_\_\_\_\_\_\_\_\_ process that happens over a long period of time.
7. As each new plant species begin to grow, \_\_\_\_\_\_\_\_\_\_\_\_ that feed on the species move into the community (fill in the blank with a word from below).
8. Consumers
9. Producers
10. Herbivores
11. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ is the slow change in species in an established community after the community has been disturbed.
12. Name 3 types of natural occurrences that could cause for secondary succession: a)\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (b)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (c)\_\_\_\_\_\_\_\_\_\_\_\_\_
13. Three examples of human-made disturbances: (a)\_\_\_\_\_\_\_\_\_\_\_\_ (b)\_\_\_\_\_\_\_\_\_\_\_ (c)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .
14. Succession will continue until a \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ is formed.
15. Some features of a stable community: (a)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (b)\_\_\_\_\_\_\_\_\_\_\_\_\_
16. \_\_\_\_\_\_\_\_\_\_ elements need to be present in order for secondary succession to occur.

Succession and Ecosystems- answer sheet Name:

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1. Ecological \_\_\_succession\_\_\_\_\_\_\_ is the predictable and orderly change over time in the types of organisms in an \_\_ecosystem\_\_\_\_\_\_\_\_.
2. Changed environments create \_\_\_\_ideal\_\_\_\_ conditions for new species.
3. \_\_\_\_Primary\_\_\_\_\_ \_\_succession\_\_\_\_\_\_ occurs in areas where there has never been life.
4. \_\_\_\_Lichen\_\_\_\_\_\_\_\_\_ are one type of organism that can colonize a bare rock and begin the process of building soil.
5. Once lichens are established, \_\_\_\_mosses\_\_\_\_\_\_\_ can now come and live in the area.
6. Succession is a \_\_\_\_gradual\_\_\_\_\_\_\_\_ process that happens over a long period of time.
7. As each new plant species begin to grow, \_\_\_\_\_\_\_\_\_\_\_\_ that feed on that species move into the community (fill in the blank with a word from below).

a) Consumers

1. Producers
2. Herbivores
3. \_\_\_\_\_Secondary \_\_\_\_\_ \_\_\_succession\_\_\_\_\_\_\_\_\_\_ is the slow change in species in an established community after the community has been disturbed.
4. Name 3 types of natural occurrences that could cause for secondary succession: a)\_\_\_forest fires\_\_\_\_\_\_\_\_\_\_\_ (b)\_\_\_\_\_strong winds\_\_\_\_ (c)\_\_\_\_floods\_\_\_\_\_\_\_
5. Three examples of human-made disturbances: (a)\_\_\_\_\_\_cutting down forests\_\_\_\_\_\_ (b)\_\_\_urban development\_\_\_\_\_\_\_\_ (c)\_\_\_\_\_mowing your lawn\_\_\_\_\_\_ .
6. Succession will continue until a \_\_\_complex \_\_\_ \_\_\_community\_\_\_\_ is formed.
7. Some features of a stable community: (a)\_large trees\_\_ (b)\_\_\_variety of animals\_\_\_\_
8. \_\_Abiotic\_\_\_\_\_ elements need to be present in order for secondary succession to occur.

**Human Impact on the Environment**

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What is being affected in our ecosystems? And how?...

|  |  |  |
| --- | --- | --- |
| AIR | WATER | HABITAT |
| * Fumes from cars, airplanes, factories * Fossil fuels from heating devices * Cigarette smoke | * Not disposing chemicals in the appropriate way * Throwing garbage * Oil spills | * Cutting down trees/forests * Human made fires * Urban development |

* These 3 categories are creating air, water, and habitat pollution and are destroying homes for species and animals

Different ways we came up with to recycle and protect our environment:

* Walk/ bus/carpool instead of driving many different cars
* Turn off water when brushing our teeth
* Recycle our garbage and electronics, use green bins
* Use solar power or wind turbines for energy
* Ask companies to take back electronic devices to be recycled
* Reuse electronic devices- don’t just throw them in the garbage
* Donate products to someone else
* Take showers instead of baths to save water
* Put a restriction on animals that can be hunted
* Not running the air conditioner for so long
* Use electronic equipment that doesn’t need batteries
* Create more hybrid cars (electric cars that don’t pollutes our air)
* Any other ideas:

\*It is very important to prevent our ecosystems from becoming polluted. **Biodiversity** (a variety of plants and animals in an ecosystem) can only be achieved with healthy air, water, and habitat\*

**Protecting our Environment**

What is an ‘**Ecological Footprint’**?

An ecological footprint estimates the amount of land and water needed to regenerate (re-create) the resources a human consumes and estimates the amount of land needed to absorb the waste being produced. It is meant to make us aware of how much of the Earth’s resources we are using. It shows us that the more we consume, use, and throw out, the larger our footprint is going to be on Earth.

What is a ‘**Steward**’ of the Earth?

A steward is a person who carefully manages a resource by taking responsibility for their actions and educating others. In order to be a steward of the Earth we to do need three things:

1. Learn about the environment
2. Change our behaviours for the environment
3. Tell others what we have learned and tell them how they can help too

Create your own acronym for what it means to be a STEWARD:

S\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

T\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

E\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

W\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

A\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

R\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

D \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Choosing Sustainable Communities

A **sustainable community** is one that more closely models an ecosystem. Changing the way communities work in order to become more sustainable benefits the health of people as well as ecosystems.

**Sustainability**: ecosystem’s ability to continue or sustain itself

Evaluating Costs and Benefits:

It is very important to reduce, reuse, and recycle, but each comes with costs and benefits. There are always 3 costs and 3 benefits to each new idea or problem:

1. Financial cost/ benefit (i.e. money)
2. Social cost/benefit (i.e. health of people, or doing something for fun)
3. Environmental cost/benefit (i.e. creating or getting rid of air pollution)

Example of a situation: Creating only hybrid cars

Costs:

*Financial costs*- costs more money to develop the technology for cars that doesn’t pollute the air (i.e. electric/ hybrid cars)

*Social costs*- not all people will want hybrid cars or will have the money to go buy another car that doesn’t use gas

*Environmental costs*- we will now have many cars being thrown out that use gas, and this will add to landfills/ garbage in our community

Benefits:

*Financial benefits*- will *decrease* healthcare costs because less people will now have respiratory illnesses from polluted air

Social benefits- there will be fewer people whose lives are being affected by illness because of air pollution

*Environmental costs*- the air that our ecosystems need to survive will be healthier and more usable

Aboriginals and Sustainable Communities:

Many Aboriginals communities are located in areas that have large amounts of natural resources. These communities have used the land and organisms around it in sustainable ways for thousands of years. Their way of life is very connected to the land; therefore they work hard to maintain healthy ecosystems. We can learn from their skills and techniques for managing the land and its resources.

For example, the Ontario Ministry of Natural Resources and the Anishinabek Nation (an Aboriginal nation) work together to help manage the Great Lakes water system in a sustainable way.

**Energy Pyramid**: Fill in each section with a definition and a picture

***Final Unit review words****: to be used in ‘Milling to Music’ (have as many words as there are students- cut them all out and give one word to each student*

Primary succession

Secondary succession

Biotic element

Abiotic Element

Consumer

Producer

Decomposer

Sustainability

Steward

Pollution of: Air, Habitat and Water

STEWARD of the Earth

Food web

Food chain

Energy Pyramid

Population

Native Species

Ecosystem

Environment

Climax Community

The 3 R’s

Human intervention Greenhouse

Negative Impact Interaction

Composter Constant State of Change